

timber from old trees is being used as an alternative to heart rimu in some of the lower-rainfall districts. On account of its good grade, larch should also be considered as an alternative to rimu for battens for some types of exterior wall sheathings, while heart larch may be considered for use as tile battens. It is of interest to note that locally grown *Eucalyptus viminalis* and *E. obliqua*, kiln-dried after preliminary air-seasoning, have been used as high-class hardwood flooring in several Forest Service houses.

Apart from the established uses of red beech and hard beech heartwood for sleepers, fence posts and rails, and bridge and mine timbers, increasing quantities are going into housing primarily for sub-floor framing, but to a limited extent for flooring. Timber containing sapwood is used for above-floor framing, furniture, handles, dowels, and similar uses. Other industrial inquiries affecting the minor species have been concerned with poplar for peeler logs, rata and maire as possible substitutes for persimmon, white manuka for handles, tawa for cooperage, redwood (imported) for fireproof doors, eucalypt logs for floating booms, and various indigenous and imported timbers to replace kauri. Numerous requests for information concerning timbers from Burma, Siam, Malaya, Borneo, and New Caledonia have been dealt with and the small supplies of these timbers which have been landed are finding a limited market.

84. *Timber Mechanics*.—Additional tests of air-dry insignis-pine material from the original Whakarewarewa test shipment, which has been in dry storage for six years, have been carried out, and the inclusion of the data from these tests with the previous results will enable a complete statistical analysis to be made and the final results prepared for publication.

Preliminary analysis has already shown that there is a definite correlation of rings per inch with strength and specific gravity with strength, but there is no correlation of rings per inch with specific gravity. This confirms the results obtained for material grown in South Africa and Australia. In the case of New Zealand material, the rings per inch and specific gravity account for 68 per cent. of variation in maximum crushing strength and for 63 per cent. of variation in modulus of rupture.

A report on the physical and mechanical properties of both green and air-dry material of thirty-year-old loblolly pine has been completed.

Air-dry values for some properties of insignis pine and loblolly pine are compared, as follows:—

	Insignis Pine, C. and D. Bolts. (Five Trees).	Loblolly Pine, C. and D. Bolts (Three Trees).
Growth rings, per inch	2 $\frac{3}{4}$	3 $\frac{3}{4}$
Specific gravity (weight oven-dry, volume green)	0.385	0.314
Weight per cubic foot, air-dry, pounds	28	24
Modulus of rupture in bending (pounds per square inch)	11,230	7,820
Modulus of elasticity in bending (1,000 lb. per square inch)	1,338	827
Maximum compressive stress parallel to grain (pounds per square inch)	5,570	4,300

Static bending tests have been carried out on laminated packs, consisting of silver beech laminations and veneers of various species. As the assemblies were mainly for handles, the tests were carried out principally for the purpose of determining the work to maximum load and work to total load.

Routine testing was continued with the Denison toughness machine on both indigenous and exotic timbers. Miscellaneous investigations have included tests of various laminated packs, the laminates varying in species and thickness, for use as hammer handles.